

CLAIMS

What is claimed is:

1 1. A method for generating a linearized amplified output signal from an input signal having
2 amplitude information, the method comprising:
3 converting the input signal into two pre-distorted signals without amplitude information;
4 separately amplifying the two pre-distorted signals; and
5 combining the two amplified, pre-distorted signals to generate the linearized amplified output signal.

1 2. The invention of claim 1, wherein:
2 the input signal is an RF signal; and
3 the linearized amplified output signal is an RF signal having amplitude information.

1 3. The invention of claim 1, wherein converting the input signal comprises:
2 pre-distorting the input signal to generate a pre-distorted input signal; and
3 converting the pre-distorted input signal into the two pre-distorted signals without amplitude
4 information.

1 4. The invention of claim 3, wherein pre-distorting the input signal comprises pre-distorting both
2 amplitude and phase of the input signal.

1 5. The invention of claim 1, wherein converting the input signal comprises:
2 generating a phase pre-distortion term from the input signal;
3 generating an amplitude pre-distortion term from the input signal;
4 detecting phase of the input signal;
5 combining the phase pre-distortion term, the amplitude pre-distortion term, and the phase in a first
6 manner and modulating at a carrier frequency to generate a first pre-distorted signal without amplitude
7 information; and
8 combining the phase pre-distortion term, the amplitude pre-distortion term, and the phase in a second
9 manner and modulating at the carrier frequency to generate a second pre-distorted signal without
10 amplitude information.

1 6. The invention of claim 5, wherein generating the phase and amplitude pre-distortion terms
2 comprise:
3 detecting amplitude of the input signal;

4 retrieving the phase pre-distortion term from a first look-up table based on the detected amplitude;
5 and
6 retrieving the amplitude pre-distortion term from a second look-up table based on the detected
7 amplitude.

1 7. The invention of claim 5, wherein:
2 in the first manner, the amplitude pre-distortion term is subtracted from the sum of the phase pre-
3 distortion term and the phase; and
4 in the second manner, the amplitude pre-distortion term is added to the sum of the phase pre-
5 distortion term and the phase.

1 8. The invention of claim 1, wherein combining the two amplified, pre-distorted signals is
2 implemented using a transformer.

1 9. The invention of claim 1, wherein combining the two amplified, pre-distorted signals is
2 implemented using a transmission line tee with transmission stubs for impedance matching.

1 10. The invention of claim 9, wherein the transmission stubs comprise shunt reactances place an
2 electrical equivalent of one-quarter wavelength away from the transmission line tee.

1 11. An amplifier circuit adapted to generate a linearized amplified output signal from an input signal
2 having amplitude information, the amplifier circuit comprising:
3 means for converting the input signal into two pre-distorted signals without amplitude information;
4 means for separately amplifying the two pre-distorted signals; and
5 means for combining the two amplified, pre-distorted signals to generate the linearized amplified
6 output signal.

1 12. An amplifier circuit adapted to generate a linearized amplified output signal from an input signal
2 having amplitude information, the amplifier circuit comprising:
3 circuitry adapted to convert the input signal into two pre-distorted signals without amplitude
4 information;
5 two amplifiers adapted to separately amplify the two pre-distorted signals; and
6 a combiner adapted to combine the two amplified, pre-distorted signals to generate the linearized
7 amplified output signal.

1 13. The invention of claim 12, wherein:

2 the input signal is an RF signal; and

3 the linearized amplified output signal is an RF signal having amplitude information.

1 14. The invention of claim 12, wherein the circuitry adapted to convert the input signal comprises:

2 a pre-distorter adapted to pre-distort the input signal to generate a pre-distorted input signal; and

3 a LINC modulator adapted to convert the pre-distorted input signal into the two pre-distorted signals
4 without amplitude information.

1 15. The invention of claim 14, wherein the pre-distorter is adapted to pre-distort both amplitude and
2 phase of the input signal.

1 16. The invention of claim 12, wherein the circuitry adapted to convert the input signal comprises:

2 circuitry adapted to generate a phase pre-distortion term from the input signal;

3 circuitry adapted to generate an amplitude pre-distortion term from the input signal;

4 a phase detector adapted to detect phase of the input signal;

5 circuitry adapted to combine the phase pre-distortion term, the amplitude pre-distortion term, and the
6 phase in a first manner and modulating at a carrier frequency to generate a first pre-distorted signal
7 without amplitude information; and

8 circuitry adapted to combine the phase pre-distortion term, the amplitude pre-distortion term, and the
9 phase in a second manner and modulating at the carrier frequency to generate a second pre-distorted
10 signal without amplitude information.

1 17. The invention of claim 16, wherein the circuitry adapted to generate the phase and amplitude pre-
2 distortion terms comprises:

3 an envelope detector adapted to detect amplitude of the input signal;

4 a first look-up table adapted to provide the phase pre-distortion term based on the detected amplitude;
5 and

6 a second look-up table adapted to provide the amplitude pre-distortion term based on the detected
7 amplitude.

1 18. The invention of claim 16, wherein:

2 the circuitry adapted to combine the phase pre-distortion term, the amplitude pre-distortion term, and
3 the phase in the first manner is adapted to generate a signal corresponding to the amplitude pre-distortion
4 term subtracted from the sum of the phase pre-distortion term and the phase ; and

5 the circuitry adapted to combine the phase pre-distortion term, the amplitude pre-distortion term, and
6 the phase in the second manner is adapted to generate a signal corresponding to the amplitude pre-
7 distortion term added to the sum of the phase pre-distortion term and the phase.

1 19. The invention of claim 18, wherein the circuitry adapted to generate the first and second pre-
2 distorted signals without amplitude information comprises:

3 a subtraction node adapted to subtract the amplitude pre-distortion term from the phase pre-distortion
4 term;

5 a first addition node adapted to add the amplitude pre-distortion term to the phase pre-distortion term;

6 a second addition node adapted to add the phase to the output from the subtraction node;

7 a first modulator adapted to modulate the output from the second addition node at the carrier
8 frequency to generate the first pre-distorted signal without amplitude information;

9 a third addition node adapted to add the phase to the output from the first addition node; and

10 a second modulator adapted to modulate the output from the third addition node at the carrier
11 frequency to generate the second pre-distorted signal without amplitude information.

1 20. The invention of claim 12, wherein the combiner comprises a transformer.

1 21. The invention of claim 12, wherein combiner comprises a transmission line tee with transmission
2 stubs for impedance matching.

1 22. The invention of claim 21, wherein the transmission stubs comprise shunt reactances place an
2 electrical equivalent of one-quarter wavelength away from the transmission line tee.